leges, reading circles at home, and farmers' institutes. Full details of the working of these schemes are given.

Legislature relating to agriculture is then dealt with, and the somewhat varying laws of the different States are summarised. Lastly, we have a number of biographies of persons who were prominent in developing "agriculture and wholesome country living, and in starting new movements of national consequence."

The volume can be cordially recommended to all who are interested in the remarkable progress of agriculture in the United States. The story is wonderfully interesting, even when told in the rather disjointed manner that is a necessary consequence of a number of authors and an encyclopædia. Problems are arising in parts of the British Empire not unlike those that have arisen in the United States. The methods by which they were dealt with there, which are so well set out in the present volume, cannot fail to afford valuable and suggestive material to agricultural workers and administrators elsewhere.

E. J. RUSSELL.

SIR JOSEPH BANKS.

Sir Joseph Banks, the "Father of Australia." By J. H. Maiden. Pp. xxiv+244. (Sydney: William Applegate Gullick; London: Kegan Paul and Co., Ltd., 1909.) Price 6*s.* net.

IN an old gazetteer we read that Botany Bay was discovered in 1770 by Captain Cook, who so named it from the great quantity of herbs which he found on its shores. This statement is true, of course, as to the main fact, but it is otherwise inaccurate and incomplete, for no doubt the name was suggested by Sir Joseph Banks's report on the vegetation of the country around their first landing-place in Australia and the very rich botanical collections obtained. After circumnavigating New Zealand the question arose whether the *Endeavour* should sail in search of the supposed southern continent or make for the coast of New Holland, and the latter course was determined upon because the condition of the ship was not considered equal to encounter the stormy southern seas. The expedition arrived in the bay on April 28 and left on May 6, and an entry in Banks's journal, dated May 3, runs as follows:

> "Our collection of plants was now grown so immensely large that it was necessary that some extraordinary care should be taken of them lest they should spoil in the books."

This note referred to the collections previously made in New Zealand, as well as the Australian plants, of which, by the way, only a small proportion were herbs.

In commemoration of this notable and important event an obelisk was erected in 1870, the centenary of the landing of Cook and Banks, but it has long been felt in Sydney that Banks's services in the exploration and colonisation of Australia have not been adequately recognised. As Mr. Maiden states in the book before us:—"His journal of the voyage was made over to Hawkesworth, who so arranged the narrative that Banks did not receive due credit." The recent publication of Banks's journal, edited by the venerable Sir Joseph Hooker, has brought to light the prominent part Banks took in the expedition, and the publication now of a portion of his correspondence shows that he was more or less actively engaged during the remaining fifty years of his life in promoting the interests of the young colony and the exploration of the surrounding country. A committee has been constituted in Sydney to collect a fund for the purpose of providing a memorial to Banks. Mr. Maiden has joined the movement, and the book he now offers the public has been compiled with the double object of disseminating information concerning "Australia's greatest early friend" and of procuring a handsome contribution to the memorial fund. It has been printed at the expense of the State of New South Wales, and the whole of the proceeds of the sale will be devoted to the object in question.

That a botanist should have undertaken this task is appropriate, and a botanist living on the spot where Australia's colonisation began, because Banks himself, though a man of universal sympathies, was essentially a botanist and horticulturist. Mr. Maiden has not written a biography of Banks, though he chronicles the leading events of his whole career. Following this he has strung together a chronological narrative of events connected with the early history of Australia, in which many important personages figure besides Banks. The whole is a highly interesting record of facts, gleaned from a variety of sources and selected for the purpose of establishing, or rather vindicating, Banks's claim to the gratitude of both the old and the new countries for the leading part he took in what has proved a most momentous movement in the population of the Antipodes. The book is fully and suitably illustrated, including portraits, early views, and reproductions of Cook's charts of Botany Bay and the entrance to the Endeavour River, on which the modern Cooktown is situated. It is a book, too, that everybody interested in Australia should read, and thereby derive much pleasure, and directly or indirectly assist the author in his patriotic effort. Short extracts from two of Banks's characteristic letters, dated 1797 and 1799, and addressed to Governor Hunter, may close this notice:—

> "The climate and soil are in my opinion superior to most which have yet been settled by Europeans. . . . I see the future prospect of empire and dominion which now cannot be disappointed. Who knows but England may revive in New South Wales when it has sunk in Europe? Your colony is already a most valuable appendage to Great Britain, and I flatter myself we shall before it is long see her Ministers made sensible of its real value."

W. B. HEMSLEY.

THE ESSENTIALS OF THE COMPARATIVE ANATOMY OF VERTEBRATES.

Vergleichende Anatomie der Wirbeltiere. By Dr. Robert Wiedersheim. Siebente Auflage. Pp. xx+936; 476 text-figures, and one lithographic plate. (Jena: Gustav Fischer, 1909.) Price 21 marks.

THE seventh edition of this well-known text-book is much more than a mere reprint of the 1906 edition, the work in its present form having experienced both a thorough revision and a considerable

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increase in bulk. Additions have been made to the accounts of nearly every system of organs, and the verbal descriptions supplemented by the inclusion of nearly one hundred new text-figures. The new figures illustrating the skulls, so coloured as to distinguish bone from cartilage, are very effective, and those of Petromyzon, Lacerta, Crocodilus, and Chelone will be found especially useful; indeed, it is a pity that a few more laboratory types (such as Hatteria, and some additional birds and mammals) were not included at the same time. The valuable literature-list—a most excellent feature of this book—has also of necessity been much enlarged.

The account of the nervous system shows a marked advance on that of the earlier editions. The description of the internal structure of the brain embodies some of the important results obtained in recent years by Edinger, Sterzi, Elliot Smith, Johnston, and other workers in this branch of anatomy. There is also included a more thorough exposition of the modern component theory of the cranial nerves, though we are of opinion that the sections treating of this subject, and of the primitive segmentation of the head, might with advantage have been still more expanded, both as regards the facts and their theoretical interpretation. The questions, for example, as to the alleged serial homology between ordinary eyes and the paired pineal organs, the primitive sensory nature of the epibranchial placodes (referred to on p. 331) and their possible connection with the eye and the nose, the late origin and consequent non-homology of the acustico-lateral system of nerves with the spinal nerves, the secondary nature of the segmental arrangement of the lateral-line sense-organs, the curious situation of the supposed gustatory organs in the external skin of certain teleosts and their innervation by the visceral sensory lateralis accessorius nerve, are all of intense interest, and worthy of a brief discussion in a book dealing with the fundamentals of vertebrate morphology. The chief results of the large amount of work recently pursued in connection with the gas-bladder of fishes have also been incorporated in the revised account of this subject, though we cannot agree with the unhesitating adoption of the Reis-Nüsbaum idea that the gas contents of the bladder are the product of the chemical decomposition of the substance of the gland-cells; in our opinion Jaeger's view, that the oxygen and other gases are derived directly from the blood and are merely pumped into the bladder cavity by the gland-cells, seems much more feasible. Among other sections of the book which have been considerably altered and extended are those relating to the morphology of the sternal skeleton, the phylogeny of the limb skeleton, the structure of the mammalian lung, the urinogenital apparatus of bony fish, and the male copulatory organs of the chief vertebrate groups.

Concerning what we venture to consider omissions in the book, we must confess that we should like to have seen, among other things, a complete account of the recent work of Osborn, Broom, and others on the Theriodont reptiles, and of the origin of the Mammalia from this ancient group, a subject of intense interest to comparative anatomists and one which has now been worked out in such complete detail that we can trace in these fossil reptilian skeletons the evolution of almost every bone in the mammalian skeleton. Again, the subject of the minute structure of fish-scales, to which Goodrich has recently directed attention, is quite untouched in the present work, though the facts are most striking, both from the standpoints of pure morphology and classification. In saying that these subjects are omissions, and thereby implying that in our opinion they should have been included, we are not unmindful that the size of the book must be kept within reasonable limits; we would only suggest that succinct accounts of the subjects just named and those before referred to are far more suitable for inclusion than descriptions and figures, *e.g.* of the external form of the ear, of the development of the cement organ of Polypterus, of the layers of the retina, and other similar topics which, though also worthy of mention, are of relatively less moment.

We may point out in conclusion that to the best of our belief the common text-book statement (p. 642) that the at-first paired umbilical (allantoic or hypogastric) veins are homologous with the epigastric veins of Amphibia and the lateral veins of Elasmobranchs has been disproved by Beddard: the two sets of veins are quite distinct.

A standard book like the present, and especially this last superb edition, is in no need of recommendation, and our recognition of this is a sufficient apology for the large proportion of criticism contained in the preceding remarks. W. N. F. W.

THREE TEXT-BOOKS OF PRACTICAL CHEMISTRY.

(1) *A Course of Practical Chemistry Suitable for Public Schools.* By A. Beresford Ryley. Pp. viii+156. (London: J. and A. Churchill, 1909.) Price 4*s.* 6*d.* net.

(2) *Introduction to Practical Chemistry, for Medical, Dental, and General Students.* By A. M. Kellas. Pp. viii+262. (London: Henry Frowde, and Hodder and Stoughton, 1909.) Price 3*s.* 6*d.* net.

(3) *First Stage Inorganic Chemistry* (*Practical*). For the First Stage Examination of the Board of Education (South Kensington). Revised Edition. By H. W. Bausor. Pp. iii+85. (London: W. B. Clive, University Tutorial Press, Ltd., 1909.) Price 1*s.*

AS a general rule, the teacher of practical chemistry yields sooner or later to the apparently irresistible temptation of writing a text-book for the use of students attending his classes. The consequent excessive multiplication of elementary treatises is, in the main, deplorable, although the contents of some of these publications afford an interesting indication of the trend of contemporaneous science teaching.

(1) The course of practical chemistry suitable for public schools is of special significance from this point of view, inasmuch as the author refers to his procedure as a retrogression from the heuristic method, a system which he dismisses as "ideal, but quite impracticable in the larger classes of public schools." This course

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